THE DISTRIBUTION OF THE TOADFLAX BROCADE *CALOPHASIA LUNULA* (HUFN.) (LEP.: NOCTUIDAE) IN BRITAIN

MARK PARSONS

Butterfly Conservation, UK Conservation Office, PO Box 444, Wareham, Dorset BH20 5YA.
E-mail: mparsons@butterfly.conservation.org

Historical background

THE HISTORY OF this moth, which was introduced as British in the nineteenth century, based on specimens said to have been caught at Woodside, North Essex, was reviewed by Bretherton et al (1983). The origin of these Essex specimens has been questioned. Bretherton et al (*op. cit.*) give the first authenticated British examples as being from Shoreham, West Sussex, in 1939, followed by Bexhill, East Sussex in 1950 and Bradwell-on-Sea, South Essex and Dungeness, East Kent in 1951. Larvae were first found at Dungeness and at Stone, West Kent, in 1952. Large numbers of larvae were subsequently found at suitable sites along the coasts of Kent, Sussex and Essex. The record of a moth near Southampton, South Hampshire, in 1971 is also given in their review of this species.

More recently, Skinner (1998) states that the species is "Well established and not uncommon at Dungeness, Kent, and found locally along the coast eastwards to Sandwich and westwards through East Sussex to Angmering, West Sussex" and cites additional records of larvae from Wakering, South Essex (1953 and 1954), Tonbridge, West Kent (1954) and Stone (1956), and of single adults from Pinden, West Kent (1953); Hamstreet, East Kent (1953 and 1996); Bookham Common, Surrey (1970); and Southsea (1992) and Gosport (1996), both South Hampshire.

Chalmers-Hunt (1960-1981) gives records of larvae being found at Folkestone (1955), Lydd-on-Sea (1960 and 1965) and Greatstone (1965), all East Kent. A single larva feeding on purple toadflax *Linaria purpurea* was found at Larkfield, 5 miles north-east of Maidstone, West Kent, in 1983 (Chambers, 1985). Further records from East Kent are of a single adult at Willesborough in 1957 (Chalmers-Hunt, 1960-1981), a single adult at Dover in 1976 (Youden, 1976), a single adult at Folkestone Warren in 1976 (Whitbread 1977), Kingsdown in 1980, two on flowers (Chalmers-Hunt, 1960-1981), and a single adult at Lade, Lydd-on-Sea in 1985 (Woiwod, 1985). In 1991, a single adult was recorded at Folkestone Warren (Julian Clarke pers. comm.). During the 1990s, the moth has been recorded regularly at Greatstone, Littlestone, Lydd and New Romney (Sean Clancy pers. comm.) and in the last three years larvae have been found in the Walmer area, East Kent, feeding on purple toadflax (Tony Harman pers. comm.). In 1996, a single adult was recorded at Sholden, East Kent by Lynn Hirst (pers. comm.).

Pratt (1999) gives records for Eastbourne (probably The Crumbles) in 1952, and in 1953 from The Crumbles, Hastings (dozens of larvae), Pett Levels (larvae), Pevensey to Bexhill (larvae) and Newhaven (larvae), all in East Sussex. Larvae were found during 1954 and 1955 from Shoreham Beach to Lancing and from Worthing in 1954, all West Sussex. An adult was recorded at Hailsham (1954), at least one

adult was seen at Camber in 1955 and in 1966 a single adult was seen at Patcham, all in East Sussex. During the 1970s, larvae were still to be found at Worthing, Lancing, Shoreham Beach and on The Crumbles. The species was also reported from Milton Street (1970), Ringmer (1972 and 1974), Houghton Green (1975), Peacehaven (1977) and Eastbourne (1978), in East Sussex and from Angmering, West Sussex (given as 1978 in Waring (in prep.)). A few larvae were found at Normans Bay, East Sussex, in 1979. The adult was first recorded at Pebsham in 1985, and has been seen there subsequently, and there have been records of the adult from Haywards Heath (1983), East Grinstead (1983) and Crowborough (1993), all East Sussex. Elsewhere during the 1980s, the moth was found at Hove (1983) and Storrington (1985), West Sussex and on The Crumbles (larvae). The moth was recorded at Worthing in 1981 but has not been seen in the area subsequently.

In the 1990s, single adults were seen at Rye Harbour in 1996 and 1997 (Barry Yates pers. comm.); Bulverhythe, near Hastings, in 1997 (two larvae) and in a Hastings garden in 1997 – one adult and larvae on purple toadflax (Paul Troake, pers. comm.), all East Sussex. Phil Budd found six larvae on common toadflax *Linaria vulgaris* on 1 July 1998 at Pagham Harbour, West Sussex. Other records for Sussex from 1990 to 1998, are from Guestling Thorn (1990, a pupa), The Crumbles (larvae), Normans Bay (single adults in 1995 and 1996), Brighton (1996 and 1997) all in East Sussex; and Hove (1996 and 1997, single larvae on purple toadflax) and Littlehampton marina (1996 and 1997), both in West Sussex (Pratt 1999).

Waring (in prep.) suggests that the species is confined as a breeding species to a few places on the south coasts of Kent and Sussex and also gives records from Portland, Dorset, in 1990 (M. Cade) and a pre-1980 record from near Penzance, Cornwall (BRC database), though this latter record is not listed in Smith (1997). There is an additional record from Dorset, that from Wareham in 1998 (Davey & Sterling, 1999). There are three further 10-kilometre squares given in Bretherton et al (1983) with records that could not be traced; these are TQ55, TQ66 and TQ64, although the latter may refer to the Tonbridge record. All three of these are pre-1960 records.

The species was listed as RDB 3 (Rare) in the insect *Red Data Book* (Shirt 1987), a status retained in Waring (in prep.). It was listed as a species on the *Middle List of Globally Threatened/Declining Species* (UK Biodiversity Group 1995) and was treated under a Species Statement in the *UK Biodiversity Group Tranche 2 Action Plans* (UK Biodiversity Group 1999).

The 1999 survey results

During 1999, an *ad hoc* survey was undertaken as part of Butterfly Conservation's *Action for Threatened Moths Project*. This was prompted by the discovery of two adults at Shoreham Beach, West Sussex, on 25 May 1999 by Simon Curson. Effort was concentrated on locating larvae, which are easily found by day in association with various species of toadflax.

Whilst visiting the Eastbourne area, on 1 July 1999, I surveyed part of what was left of The Crumbles, the coast at Pevensey Bay and an area of vegetated shingle at Normans Bay. Unfortunately the latter site did not appear to support any of the food

plants, but larvae were found on purple toadflax at both the former two sites (25 in half an hour and seven during a 20 minute search respectively). A subsequent, more thorough search of a small area of The Crumbles located 132 larvae, all associated with purple toadflax (David Burrows pers. comm.). Much of The Crumbles has been decimated by development and part of the remaining area supporting this species is destined to become housing. A small remnant is being conserved and has been recognised as a Site of Nature Conservation Importance.

On 2 July 1999 I found three larvae during a one-hour search of a thin strip of vegetated shingle at Shoreham Beach. All were feeding on purple toadflax. A brief search of sites around Lancing and Worthing in the adjacent western 10-kilometre square proved negative, despite the presence of both purple toadflax and common toadflax. Tide Mills, near Newhaven, East Sussex was also searched; this was found to have a profusion of common toadflax, but no larvae were found.

The following month, on 17 August 1999, I searched parts of the Hampshire and West Sussex coast. No larvae were found on Browndown, South Hampshire, but larvae were found at Pagham Harbour (17 in total, 15 on purple toadflax and two on common toadflax) confirming the continued presence of this species at this site. Six larvae, all on purple toadflax, were found in an adjacent 10-kilometre square on a small area of beach at Middleton-on-Sea. Brief searches in the Elmer, Felpham, Aldwick and Atherington areas of West Sussex all proved negative, with no toadflax to be found at these sites with the exception of two plants of purple toadflax at Aldwick.

A more extensive search was undertaken on the 19 August 1999. I surveyed a stretch of the coast from Deal, East Kent, to Newhaven, excluding Dungeness and The Crumbles area. The search route took in roads following the coast wherever possible and suitable sites spotted from the car in each of the 10-kilometre squares between these two points were searched. Larvae were found in East Kent at Kingsdown (two on common toadflax) and just to the east of Hythe Ranges (three all on purple toadflax). A previous search of the Ministry of Defence holdings at Hythe Ranges by Sean Clancy had proved negative. Two larvae were found at Bulverhythe on common toadflax. A search around Walmer Castle and Folkestone, East Kent, and Rye, Seaford and a further search of Tide Mills, all in East Sussex, on this date proved negative. On a later date, Paul Troake undertook a search of plants on Rye Harbour LNR, although toadflax is not well represented at the site; no larvae were found.

A search by myself around the Witterings in the extreme west of Sussex on 23 August 1999 proved negative for the food plants.

On 23 August 1999, Sean Clancy found larvae in both of the 10-kilometre squares that cover Dungeness. In the square TQ 01, all larvae were found on common toadflax, whereas in square TQ 02, larvae were found on both common toadflax and purple toadflax.

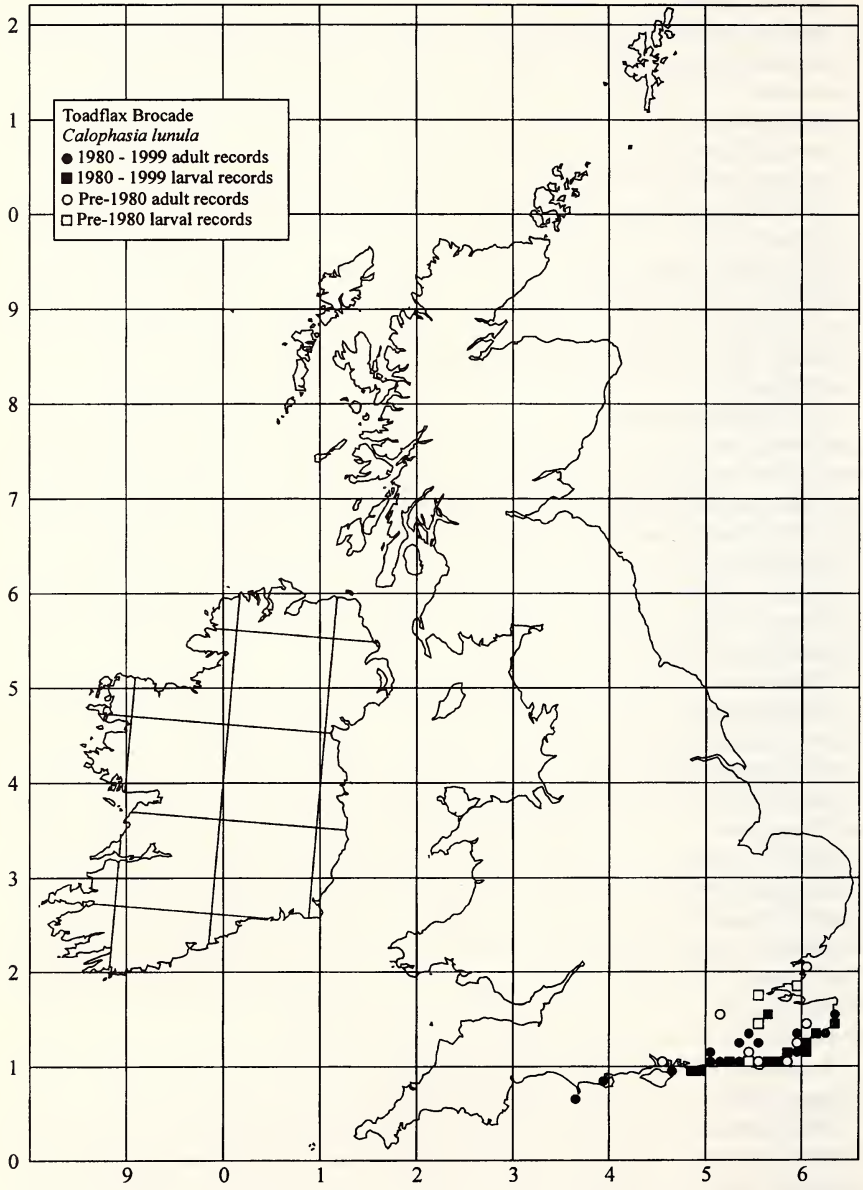

Figure 1. Distribution of Toadflax Brocade *Calophasia lunula*, by 10km squares.

Discussion and summary

Prior to the survey, records suggested a distribution between Sandwich, East Kent and Pagham, West Sussex, with few published larval records. Research for this paper gleaned recent (1980 onwards) larval records for nine 10-kilometre squares, two of which were from the Dungeness area and two of which were probably short-term establishments. No record has been found to substantiate the claim for Sandwich, although records have been found for nearby Walmer and Sholden.

As a result of the 1999 survey, larvae were found in nine 10-kilometre squares. There is a further 10-kilometre square with records of larvae since 1990, although this is unlikely to represent a long-term establishment. Figure 1 summarises the known distribution of the species. Away from Dungeness, the sites where larvae were found are typically thin strips of vegetated shingle that had previously been disturbed and with a high proportion of open shingle. All the sites where the species survives suggest a requirement for a warm and dry micro-climate.

It is still possible that some sites have been overlooked, for example time did not permit a survey of possible habitat between Littlehampton and Worthing (a further two potential 10-kilometre squares), a further site to the one searched at Normans Bay which supported the food plant at least as recently as 1998 (Colin Pratt pers. comm.) and the shingle beach at Cuckmere Haven (a further 10-kilometre square). Also, time did not permit the investigation of whether or not suitable habitat occurs at the base of cliffs, for example around Beachy Head and at Fairlight, East Sussex.

The food plants of the species are given by Skinner (1998) to be "mainly common toadflax [*Linaria vulgaris*], also occasionally on purple toadflax (*Linaria purpurea*) and pale toadflax (*L. repens*)". It is, therefore, interesting to note that, during the present survey, all but six larvae were found to be associated with purple toadflax.

The known range of this species in Britain has not greatly altered as a result of this rather piecemeal survey, but it may occur on other parts of the Kent and possibly Essex coast (these areas were not searched). However, we now have a far better understanding of the species' current distribution. It is apparent from the records that although it has been recorded inland as both larvae and adults on several occasions, it has still not been able to permanently establish itself away from the coast.

Bretherton *et al* (1983) stated that "since about 1960 it has become scarcer in some places and disappeared from others", although the 1971 record "may indicate either further extension westward or new immigration". The records researched, and undoubtedly some have been missed, do indicate a comparative paucity of records of the Toadflax Brocade during the 1960s. However, it is possible that an alternative explanation for this apparent decline may be a reduction in specific searches for the species during those years. Perhaps the only way to determine possible fluctuations in this species fortunes are to annually monitor populations at the edge of its range and to survey adjacent, but currently unoccupied, suitable habitat.

This summary, along with the present survey, demonstrates that the well known sites for scarce species are not always the only ones and effort concentrated on areas away from these well known sites could contribute greatly to our understanding of individual species. The Species Statement in the Biodiversity Action Plan (UK

Biodiversity Group 1999) advocates monitoring of this species. It is hoped that, with local co-operation, annual monitoring will be put in place at key sites for the species. As Butterfly Conservation is the Lead Partner to oversee action for this species, we would be pleased to hear of any additional records of the Toadflax Brocade.

Acknowledgements

The Action for Threatened Moths Project is funded by English Nature (Species Action Programmes) and Butterfly Conservation. I would like to take this opportunity to thank Phil Budd, David Burrows, Dr Julian Clarke, Simon Curson, Tony Harman, Lynn Hirst and Barry Yates for allowing the use of their records, Bernard Skinner for his comments, and Sean Clancy and Paul Troake for records and for assisting with the survey. I would especially like to thank Colin Pratt for providing a preview of the Toadflax Brocade text from Pratt (1999) and for comments on an early draft of the text; Dr Ian McLean, Joint Nature Conservation Committee, for allowing a preview of Dr Paul Waring's forthcoming review and David Green for preparing the map.

References

Bretherton, R. F., Goater, B. & Lorimer, R. I., 1983. *Noctuidae* (continued), in J. Heath & A.M. Emmet (eds.) *The Moths and Butterflies of Great Britain and Ireland.* Volume 10. Harley Books, Colchester.

Chalmers-Hunt, J. M., 1960-1981. *The butterflies and moths of Kent.* Published as supplements to *Entomologist's Rec. J. Var.* **72-93**.

Chambers, D. A,. 1985. A non-coastal breeding record on *Calophasia lunula* Hufn.: Toadflax Brocade. *Entomologist's Rec. J. Var.* **97**: 108.

Davey, P. & Sterling, P.H., 1999. Migrant highlights. Moths of Dorset Newsletter No. 6: 5.

Pratt, C., 1999. *A revised history of the butterflies and moths of Sussex.* Booth Museum of Natural History, Brighton.

Shirt, D., (ed.). 1987. *British Red Data Books: 2. Insects.* Nature Conservancy Council, Peterborough.

Skinner, B., 1998. *Colour identification guide to moths of the British Isles.* Viking, London.

Smith, F. H. N., 1997. *The moths and butterflies of Cornwall and the Isles of Scilly.* Gem Publishing, Wallingford.

UK Biodiversity Group, 1995. *Biodiversity: The UK Steering Group Report. Volume 2: Action Plans.* HMSO, London.

– , 1999.*UK Biodiversity Group Tranche 2 Action Plans. Volume IV - invertebrates.* English Nature, Peterborough.

Waring, P., in prep. *Review of Nationally Scarce and Threatened Macro-moths of Great Britain.* Joint Nature Conservation Committee, Peterborough.

Whitebread, S. E., 1977. *Calophasia lunula* (Hufn.) and other interesting moths at Folkestone. *Entomologist's Rec. J. Var.* **89**: 11.

Woiwod, I. P., 1985. A further record of the spring brood of the Scarce Chocolate Tip: *Clostera anachoreta* D. & S. *Entomologist's Rec. J. Var.* **97**: 164.

Youden, G. H., 1976. *Nola aerugula* (Hubner) and other interesting occurrences at Dover. *Entomologist's Rec. J. Var.* **88**: 267.